

(1) Section 71.71 (“Normal conditions of transport”), there would be no loss or dispersal of radioactive contents—as demonstrated to a sensitivity of 10^{-6} A_2 per hour, no significant increase in external surface radiation levels, and no substantial reduction in the effectiveness of the packaging; and

(2) Section 71.73 (“Hypothetical accident conditions”), there would be no escape of krypton-85 exceeding 10 A_2 in 1 week, no escape of other radioactive material exceeding a total amount A_2 in 1 week, and no external radiation dose rate exceeding 10 mSv/h (1 rem/h) at 1 m (40 in) from the external surface of the package.

(b) Where mixtures of different radionuclides are present, the provisions of appendix A, paragraph IV of this part shall apply, except that for Krypton-85, an effective A_2 value equal to 10 A_2 may be used.

(c) Compliance with the permitted activity release limits of paragraph (a) of this section may not depend on filters or on a mechanical cooling system.

§ 71.52 Exemption for low-specific-activity (LSA) packages.

A package need not satisfy the requirements of § 71.51 if it contains only LSA or SCO material, and is transported as exclusive use, but is subject to §§ 71.41 through 71.47, including § 71.43(f). This section expires April 1, 1999.

EFFECTIVE DATE NOTE: At 60 FR 50264, Sept. 28, 1995, § 71.52 expires April 1, 1999.

§ 71.53 Fissile material exemptions.

Fissile materials meeting the requirements of one of the paragraphs in (a) through (d) of this section are exempt from fissile material classification and from the fissile material package standards of §§ 71.55 and 71.59, but are subject to all other requirements of this part. These exemptions apply only when beryllium, graphite, or hydrogenous material enriched in deuterium is not present in quantities exceeding 0.1 percent of the fissile material mass.

(a) Fissile material such that

$$\frac{\text{grams of uranium} - 235}{X} + \frac{\text{grams of other fissile material}}{Y} \leq 1$$

for an individual consignment, where X and Y are the mass limits defined in table following paragraph (a)(3) of this section, provided that:

(1) Each package contains no more than 15 g of fissile material. For unpackaged material the mass limit of 15g applies to the conveyance; or

(2) The fissile material consists of a homogeneous hydrogenous solution or mixture where the minimum ratio of

hydrogen atoms to fissile radionuclide atoms (H/X) is 5200 and the maximum concentration of fissile radionuclides within a package is 5 g/liter; or

(3) There is no more than 5g of fissile material in any 10 liter volume of material and the material is packaged so as to maintain this limit of fissile radionuclide concentration during normal transport.

THE REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL

Fissile material	Fissile material mass (g) mixed with substances having an average hydrogen density less than or equal to water	Fissile material mass (g) mixed with substances having an average hydrogen density greater than water
Uranium-235(X)	400	290
10Other fissile material(Y)	250	180

(b) Uranium enriched in uranium-235 to a maximum of 1 percent by weight, and with total plutonium and uranium-233 content of up to 1 percent of the mass of uranium-235, provided that the fissile material is distributed homogeneously throughout the package contents and does not form a lattice arrangement within the package.

(c) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2 percent by weight, with a total plutonium and uranium-233 content not exceeding 0.1 percent of the mass of uranium-235, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2.

(d) Plutonium, less than 1 kg, of which not more than 20 percent by mass may consist of plutonium-239, plutonium-241, or any combination of these radionuclides.

[62 FR 5913, Feb. 10, 1997]

§ 71.55 General requirements for fissile material packages.

(a) A package used for the shipment of fissile material must be designed and constructed in accordance with §§ 71.41 through 71.47. When required by the total amount of radioactive material, a package used for the shipment of fissile material must also be designed and constructed in accordance with § 71.51.

(b) Except as provided in paragraph (c) of this section, a package used for the shipment of fissile material must be so designed and constructed and its contents so limited that it would be subcritical if water were to leak into the containment system, or liquid contents were to leak out of the containment system so that, under the following conditions, maximum reactivity of the fissile material would be attained:

(1) The most reactive credible configuration consistent with the chemical and physical form of the material;

(2) Moderation by water to the most reactive credible extent; and

(3) Close full reflection of the containment system by water on all sides, or such greater reflection of the containment system as may additionally be provided by the surrounding material of the packaging.

(c) The Commission may approve exceptions to the requirements of para-

graph (b) of this section if the package incorporates special design features that ensure that no single packaging error would permit leakage, and if appropriate measures are taken before each shipment to ensure that the containment system does not leak.

(d) A package used for the shipment of fissile material must be so designed and constructed and its contents so limited that under the tests specified in § 71.71 ("Normal conditions of transport")—

(1) The contents would be subcritical;

(2) The geometric form of the package contents would not be substantially altered;

(3) There would be no leakage of water into the containment system unless, in the evaluation of undamaged packages under § 71.59(a)(1), it has been assumed that moderation is present to such an extent as to cause maximum reactivity consistent with the chemical and physical form of the material; and

(4) There will be no substantial reduction in the effectiveness of the packaging, including:

(i) No more than 5 percent reduction in the total effective volume of the packaging on which nuclear safety is assessed;

(ii) No more than 5 percent reduction in the effective spacing between the fissile contents and the outer surface of the packaging; and

(iii) No occurrence of an aperture in the outer surface of the packaging large enough to permit the entry of a 10 cm (4 in) cube.

(e) A package used for the shipment of fissile material must be so designed and constructed and its contents so limited that under the tests specified in § 71.73 ("Hypothetical accident conditions"), the package would be subcritical. For this determination, it must be assumed that:

(1) The fissile material is in the most reactive credible configuration consistent with the damaged condition of the package and the chemical and physical form of the contents;

(2) Water moderation occurs to the most reactive credible extent consistent with the damaged condition of the package and the chemical and physical form of the contents; and